CLAIMS

1. A method for forming a structure from a semiconductor structure having a first layer of a first material formed on a second layer of a second material, the second layer having a first side proximate to the first layer and a second side proximate to a substrate, the method comprising:

selectively etching the first layer to form a first opening therein, the first opening having a first dimension and exposing a portion of the second layer;

selectively etching the second layer to form a second opening therethrough, the second opening having a first dimension on the first side and a second dimension on the second side, the first dimension of the second opening greater than the second dimension of the second opening and greater than the first dimension of the first opening; and

selectively etching the substrate through the first and second openings to form a trench therein.

2. The method of claim 1, further comprising:

removing the first layer;

forming a layer of insulating material over the second layer and within the trench;

removing a portion of the layer of insulating material over the second layer and a portion of the second layer; and

removing any remaining portions of the second layer.

3. The method of claim 1, further comprising:

removing the first layer;

forming a layer of conductive material over the second layer and within the trench; and

removing a portion of the layer of conductive material over the second layer and a portion of the second layer.

4. The method of claim 1 wherein the first material comprises a silicon oxide material and the second material comprises a silicon nitride material.

5. The method of claim 1 wherein selectively etching the second layer comprises isotropically etching the second layer.

6. A method for forming an isolation region from semiconductor structure having a substrate and a first layer of a first material formed thereover, the first layer having a first side proximate to the substrate and a second side opposite the first side, the method comprising:

forming a hard mask layer over the second side of the first layer, the hard mask layer having a first opening exposing the first layer;

undercutting the first layer beneath the first opening in the hard mask layer;

selectively etching the substrate through the first opening to form a trench therein;

removing the hard mask layer;

forming a layer of insulating material over the first layer and in the trench; and

removing the layer of insulating material over the first layer and removing the first layer.

7. The method of claim 6 wherein undercutting the first layer beneath the first opening comprises isotropically etching the first layer.

8. The method of claim 6 wherein forming a hard mask layer having a first opening comprises:

forming a layer of a silicon oxide material over the second side of the first layer; and

selectively etching through the layer of silicon oxide material to form the first opening.

9. The method of claim 6 wherein removing the layer of insulating material over the first layer comprises etching the layer of insulating material with a chemical-mechanical etching process.

10. The method of claim 6 wherein the first material comprises a silicon nitride material.

11. A method for filling a trench formed in semiconductor substrate, comprising:

forming a first layer over the substrate having a first side proximate to the substrate and a second side opposite of the first side;

forming a hard mask layer over the second side of the first layer, the hard mask layer having an opening therethrough;

selectively overetching through the first layer to form faceted surfaces underlying the opening through the hard mask layer;

etching a trench in the substrate through the opening and the first layer;

removing the hard mask layer; and

forming a layer over the first layer and within the trench.

12. The method of claim 11 wherein selectively overetching through the first layer to form faceted surfaces comprises isotropically etching the first layer.

13. The method of claim 11 wherein forming the layer over the first layer and within the trench comprises forming a layer from an insulating material.

14. The method of claim 13, further comprising:

removing the layer of insulating material over the first layer; and

removing the first layer.

15. The method of claim 11 wherein forming the layer over the first layer and within the trench comprises forming a layer from a conductive material.

16. The method of claim 15, further comprising:

forming a dielectric layer over the layer of conductive material; and

forming a second layer from a conductive material over the dielectric layer to form a capacitor plate.

17. A method for forming a semiconductor structure on a substrate, comprising:

forming a first layer of a first material over the substrate;

forming a faceted opening through the first layer; and

etching a trench in the substrate through the faceted opening.

18. The method of claim 17 wherein forming the first layer of a first material comprises forming the first layer from a silicon nitride material.

19. The method of claim 17 wherein the first material and the material of the substrate can be selectively etched with respect to one another.

20. The method of claim 17 wherein forming a faceted opening through the first layer comprises:

forming a mask layer over the first layer;

exposing a portion of the first layer through an opening in the mask layer;

selectively etching the first layer through the opening in the mask layer.

21. The method of claim 20 wherein selectively etching the first layer comprises isotropically etching the first layer.

22. A method for forming a semiconductor structure on a substrate, comprising:

forming a first layer of a first material over the substrate, the first material and the material from which the substrate is formed can be selectively etched with respect to one another; and

forming a faceted opening through the first layer.

23. The method of claim 22 wherein forming a faceted opening through the first layer comprises:

forming a mask layer over the first layer;

exposing a portion of the first layer through an opening in the mask layer;

selectively etching the first layer through the opening in the mask layer.

24. The method of claim 23 wherein selectively etching the first layer through the opening comprises isotropically etching the first layer.

25. A semiconductor structure, comprising:

a trench formed in a substrate;

a first layer of a first material formed over the substrate and having an faceted opening therethrough over the trench; and

a mask layer formed over the first layer and having an opening therethrough over the opening of the first layer.

26. The semiconductor structure of claim 25 wherein the faceted opening of the first layer undercuts the opening of the mask layer.

27. The semiconductor structure of claim 25 wherein the first material comprises a silicon nitride layer.

28. The semiconductor structure of claim 25 wherein the mask layer comprises a layer of a silicon oxide material.

29. The semiconductor structure of claim 25, further comprising a layer of insulating material filling the trench.

30. A semiconductor structure, comprising:

a trench formed in a substrate; and

a first layer of a silicon nitride material formed over the substrate and having an faceted opening therethrough over the trench.

31. The semiconductor structure of claim 30, further comprising a layer of insulating material filling the trench.

32. The semiconductor structure of claim 30, further comprising a pad oxide layer interposed between the first layer and the substrate, the pad oxide layer having an opening therethrough over the trench.

33. A semiconductor structure, comprising:

a trench formed in a substrate; and

a first layer of a silicon nitride material formed over the substrate and having a first side proximate to the substrate and a second side opposite of the first side, and further having an opening therethrough over the trench, the opening having a first dimension along the first side and a second dimension along the second side greater than the first dimension.

34. The semiconductor structure of claim 33 wherein the materials from which the substrate and the first layer are formed can be selectively etched with respect to one another.

35. The semiconductor structure of claim 33 wherein the opening of the first layer is tapered.

36. The semiconductor structure of claim 33 wherein the opening of the first layer is faceted.

37. A semiconductor structure, comprising:

a trench formed in a substrate;

a mask layer having an opening therethrough and located over the trench; and

a first layer interposed between the substrate and the mask layer, the first layer having an opening undercutting the opening of the mask layer.

38. The semiconductor structure of claim 37 wherein:

the opening through the mask layer having a first dimension;

the first layer having a first side proximate to the substrate and a second side opposite the first side; and

the opening of the first layer having a first dimension along the first side and a second dimension along the second side greater than the first dimension of the opening through the mask layer and also greater than the first dimension of the opening of the first layer.

39. The semiconductor structure of claim 37 wherein the materials from which the first layer and the mask layer are formed can be selectively etched with respect to one another.

40. The semiconductor structure of claim 37 wherein the mask layer comprises a layer formed from a silicon oxide material.

41. The semiconductor structure of claim 37 wherein the first layer comprises a layer formed from a silicon nitride layer.